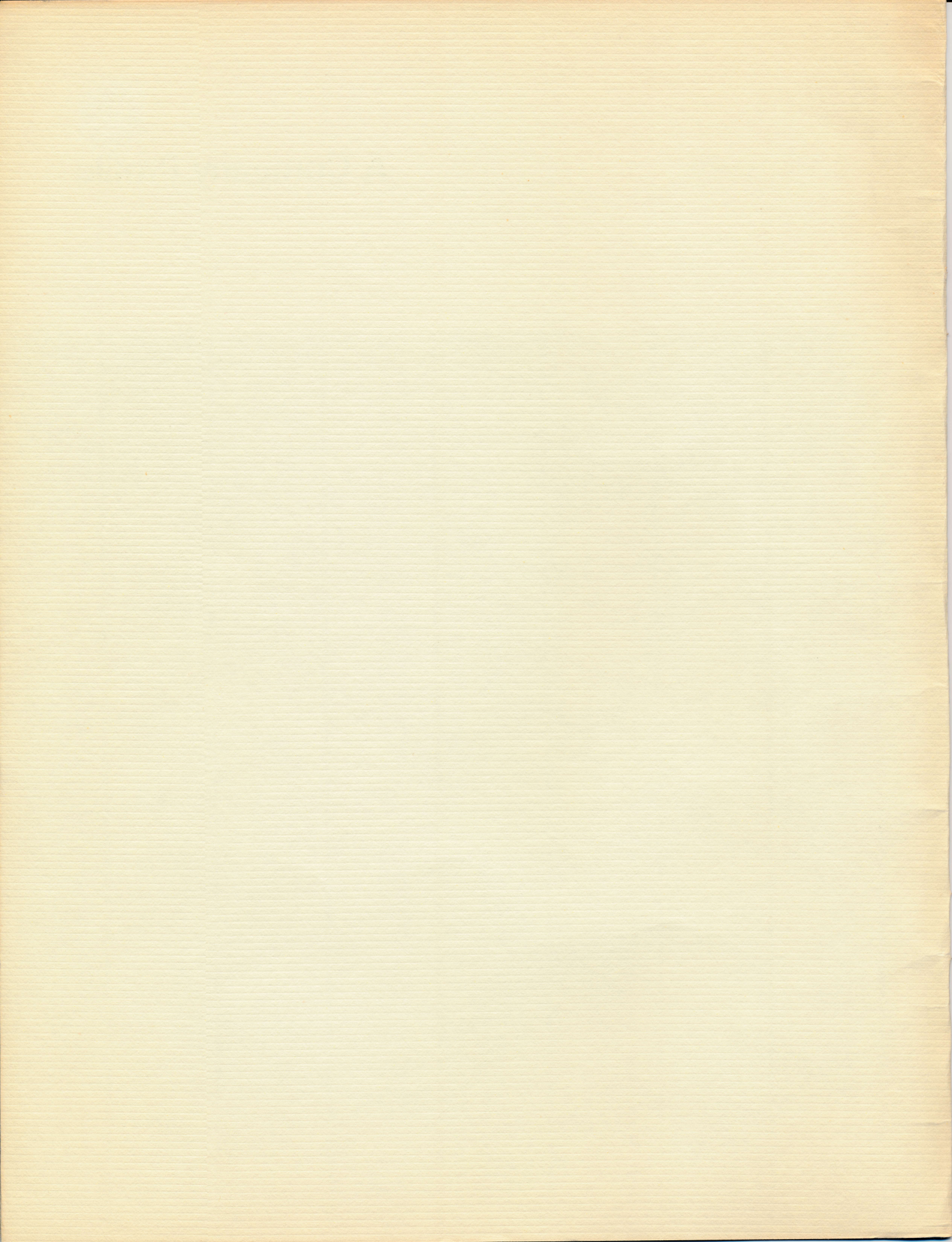




I.P. Sharp Associates

A Company Profile





A COMPANY PROFILE

Copyright January 1980

All rights reserved. This book or parts thereof may not be reproduced by any means without the written permission of J.E. Sharp Associates Limited

Printed in Canada
Publication Code X80C101

A COMPANY PROFILE

Copyright January 1980.

All rights reserved. This book or parts thereof may not be reproduced by any means without the written permission of I.P. Sharp Associates Limited.

Printed in Canada.

Publication Code: X80CP01

TABLE OF CONTENTS

	Page
GENERAL INTRODUCTION	
SHARP APL	1
The Network	1
Public Data Bases	2
People	2
Education	2
Consulting	2
Sharp Special Systems	2
History	3
SHARP APL	
Time-sharing Service	4
Development	4
Reliability	5
High Volume Data Entry	5
Highspeed Printing	6
In-house SHARP APL	6
TELECOMMUNICATIONS	
Access to the Network	7
Network Features	7
Terminal Support	7
Network Hardware	8
Packet-Switching	8
Line Utilization	9
Network Intelligence	9
Telex	9
COMPUTER CENTRE FACILITIES	
Hardware	10
Hours of Operation	10
SYSTEM SOFTWARE	
APL	11
File System Software	11
Applications Library Software	12
APPLICATION SOFTWARE	
Corporate Planning/Project Analysis	13
Data Base Management/Reporting Systems	14
Graphics	14
Insurance	14
Gas and Oil Industry	15
Econometrics/Forecasting	15
Critical Path and Network Analysis	15
Text Processing	15
Electronic Mail	16

TABLE OF CONTENTS

DATA BASES

- Private Data Bases
- Public Data Bases

17
17

DOCUMENTATION

- General News
- SHARP APL Reference Manual
- Public Library and Data Base Documentation
- SHARP APL Technical Notes

18
18
18
18

TECHNICAL SUPPORT

- General Customer Support
- System Education
- Consulting

19
19
19

SECURITY

- System Failure
- Computer Centre Security
- Data Backup Procedures
- Access Security

20
20
20
21

CONTRACT TERMS

22

GENERAL INTRODUCTION

I.P. Sharp Associates is a computer time-sharing company with international headquarters in Toronto, Canada. Through our worldwide communications network we offer access to SHARP APL and to an extensive library of software applications. We maintain technical support staff in many major cities. Our Special Systems division provides turnkey systems, feasibility studies and general data processing consulting services.

SHARP APL

SHARP APL is one of the most effective computer languages available today. If you are wondering which language to use for a particular project, think of these advantages of using APL:

Speed. A system implemented in APL can be developed significantly faster than in another language.

Flexibility. A customized APL program can be developed to meet your exact needs, thereby surpassing the general "packaged" programs found on other systems.

Serviceability. Program maintenance is relatively easy because APL's modularity facilitates localized program changes.

Responsiveness. Because of its interactive nature, APL is specially suited for user-oriented applications.

With its high-performance APL system, Sharp provides numerous additional features. These include batch APL, extended data types, and a user-oriented file system.

You can use SHARP APL either by dialling the I.P. Sharp computer centre through any of its local access numbers across the world, or alternatively by installing a SHARP APL system on your own computer. In either case you can use the Sharp network to link the branch locations of your organization.

THE NETWORK

By making a local telephone call, you can connect to the Sharp system from several hundred cities around the world. In addition to the private Sharp network in North America, Europe, and Australia, you can also connect through the facilities of Tymnet and Telenet in North America and Europe, and Datapac in Canada. Certain nodes in the Sharp network also accommodate access via Telex facilities.

The Sharp network facilitates communication within your organization by enabling you to store data and programs in one central location accessible to each of your offices. We offer 24-hour service on weekdays, and 16-hour service on weekends, which makes our service immediately available in any time zone.

PUBLIC DATA BASES

I.P. Sharp offers a growing number of public data bases covering a variety of applications and industries. Our public data base library includes: daily currency exchange rates, Statistics Canada's CANSIM Mini Base data, securities data from U.S. and Canadian stock exchanges, the Official Airline Guide (supplied by Official Airline Guides, Inc.), and data from the U.K. Central Statistics Office. These centralized data bases are available to Sharp customers around the world.

The data available in these data bases is historical, going back days, weeks, months, years, or in some cases, decades. It is most commonly used with APL functions that plan and forecast. You can combine private data with information from one or more public data bases into analytical models and to produce finished reports and/or plots.

Many of our data bases are acquired from well-known suppliers of data, such as Financial Post, Statistics Canada, the U.S. Civil Aeronautics Board, the International Monetary Fund, the U.K. Central Statistics Office, and the American Petroleum Institute. Other data bases are created and maintained by I.P. Sharp from a survey of the appropriate public literature.

PEOPLE

We are proud of our staff of APL analysts and programmers. In each Sharp office, you will find responsive people, with the expertise for solving your problem. Whether you need instruction on how to get started, advice on how to use the system most effectively, APL enrichment courses, or consulting, Sharp personnel are ready to help.

EDUCATION

To help you make the most effective use of the Sharp system, courses and seminars are available in local offices as needed. Sessions range in length from a half day to a week. They cover such topics as A Taste of APL, Advanced APL, Retrieving Time Series Data, Report Formatting, Forecasting Methods, and SHARP APL File Design.

CONSULTING

I.P. Sharp offers contract programming and systems design in APL on a consulting basis to all clients who don't wish to write an APL application themselves. Our technical consulting staff is available in over 40 cities worldwide.

SHARP SPECIAL SYSTEMS

In the years since its founding, I.P. Sharp Associates has implemented many turnkey systems on minicomputers and customer mainframes. Such projects include: multi-minicomputer airport control systems in both Canada and Europe, microfilm retrieval systems used by police departments and large banks, dual-redundant plant monitoring and process monitoring/control systems, and mass spectrometer control systems. The Special Systems division has also undertaken research and development projects funded both by the Canadian Department of National Defence and by the U.S. Department of Defence, delving into such areas as radar signal processing, provably secure language processors, security of operating systems, and data base management systems. I.P. Sharp also performs feasibility studies and general data processing consulting for customers in the private and the public sectors.

Special Systems personnel are based at several of the larger Sharp offices, though they will undertake projects anywhere. SHARP APL is often an integral part of such systems, or may be used as a development tool. Hence, I.P. Sharp has the rather notable ability to provide either a time-sharing or a dedicated computer solution to most clients' problems.

HISTORY

I.P. Sharp was founded in 1964 by Ian Sharp and seven colleagues. Between 1964 and 1969, the company was engaged solely in systems consulting. Sharp's involvement with APL started during that period when Roger Moore, technical vice-president, played a major role in the first implementation of APL, under contract to a large computer manufacturer.

In 1969, I.P. Sharp became the first company in Canada, and second in the world, to offer APL on a commercial basis.

APL was first adopted by the scientific community, but rapidly gained commercial acceptance, so that now the great majority of our customers are in business and industry. I.P. Sharp Associates has been one of the leaders in developing APL as a language for commercial applications. Our customer base has grown to more than 600 companies, with some companies accessing their centralized programs and data bases from terminals located around the world.

The following table traces the growth of the Sharp computer system in terms of host machine and workspace size.

August	1969	IBM 360/50	32K byte workspace
November	1971	IBM 370/145	48K byte workspace
July	1973	2 IBM 370/145's	88K byte workspace
September	1975	2 IBM 360/75's	100K byte workspace
September	1977	Amdahl 470 V6 Mod II, IBM 360/75	170K byte workspace
March	1979	2 Amdahl 470 V6 Mod II's	256K byte workspace

SHARP APL

TIME-SHARING SERVICE

I.P. Sharp Associates offers SHARP APL in both interactive and batch modes. From your own premises, using a variety of terminals, you can "sign on" to the system via a telephone connection. Each user has a 256 kilobyte workspace (section of memory) in which to work. This area may contain both functions (programs) and data. You may store any number of workspaces on disk for later retrieval.

The SHARP APL file system is based on the principles of shared direct access and total security. It is highly effective for storing both data and programs. The file system is easy to use, and well suited to large data base applications.

For high volume data input or output, it may be inconvenient to use an interactive terminal. I.P. Sharp Associates provides facilities both for entering data via cards, tape, or disk, and for printing long reports on a highspeed printer.

DEVELOPMENT

A research and development group of about 20 people provides SHARP APL users with a "state of the art" APL system. This group designs and implements new system features, in addition to "fine tuning", making the existing system more efficient. The SHARP APL interpreter is constantly being speeded up, decreasing execution time and improving response time.

Some of the most important developments to the system have been:

"Immediate" batch APL — A program started in this way executes immediately, but doesn't use a terminal. CPU charges are reduced by approximately 25% and there are no connect or character charges.

"Deferred" batch APL — A program submitted in this way is withheld from execution until the system resources become available. CPU charges are reduced by 50% and there are no connect or character charges.

Report Formatting — The system function `□FMT` provides sophisticated report formatting of data tables.

Package data — This data type allows you to "pack" into a single data object any collection of APL objects, whether they be functions, numeric data, character data, or other packages. Packages may be saved in a workspace like other data or each may be written as a component of a file.

Record of output — The system function `□OUT` permits you to direct output either to a terminal or to a file which can be retained for re-use or printed on a highspeed printer.

Event detection — This facility allows the user to “trap” certain events which would otherwise cause functions to be interrupted with an error condition. This feature is of particular interest if you are concerned with system security, or if you need to provide automatic correction of mistaken entries from naive users.

Files — Allows flexible file designs, quick implementation of new systems, and strict security control.

Shared Variables — This facility provides an interface which enables independent APL tasks to communicate with each other. It also provides a mechanism by which an APL task can communicate with an auxiliary processor written in another language.

Batch sorting — Large data files may be sorted by submitting a batch sort request.

RELIABILITY

Many companies have come to rely on I.P. Sharp for all or part of their computing needs. Sharp is well aware of its responsibility to provide customers with a reliable system. The Sharp centre has been “up” for better than 99% of its scheduled time, which includes non-stop operation Sunday to Friday, and totals 154 hours a week.

In addition to ensuring a reliable communications network through the use of sophisticated minicomputers, I.P. Sharp has taken precautions in the area of computer hardware. All system hardware is redundant (see “Computer Centre Facilities”). The main processor is fully backed up; either computer can support the entire system load on its own, in the event that one computer fails.

When work is interrupted by a communications failure in the link between you and the computer, or by an equipment failure at the central computer, your current work is saved at the instant of interruption, so that you can resume processing at that point as soon as service is restored.

HIGH VOLUME DATA ENTRY

In most situations, data is entered into the system through a terminal keyboard. However, occasionally the need arises to transfer large volumes of data directly into the system. In this case, any machine readable data can be put into an APL file. This data may be on tape, cards, or disk.

There are two ways to transfer data from a remote location to the Toronto computer centre. Data can be sent electronically, if appropriate facilities are available in your locale. This requires a data input device (tape drive, card reader, or disk drive) that is compatible with a Mohawk 2400 computer, or with a HASP system that supports remote job entry (RJE).

In the absence of local facilities, the data can be physically sent (via mail, air express, courier, etc.) to the Toronto computer centre, or to the nearest I.P. Sharp office with appropriate facilities. During 1980, binary synchronous interfaces, utilizing IBM 2780, 3780 and 2968 protocols, will become available at several I.P. Sharp offices.

HIGHSPEED PRINTING

Bulk output need not be printed on a terminal. There are several alternative printing procedures:

1. One possibility is highspeed printing at the Toronto computer centre. Output printed there is sent via mail, air express, or courier to you.
2. Another possibility is highspeed printing at an I.P. Sharp branch office. Using this procedure, output is transmitted to a Mohawk 2400 in the branch office by means of an off-line tape-to-tape transfer from a Mohawk 2400 in the Toronto office. After the data is received, it is then printed on a highspeed printer.
3. A third possibility is off-line highspeed printing at a local service bureau.
 - a. If the service bureau has equipment that is compatible with a Mohawk 2400, the transfer and printing take place as in (2) above.
 - b. If the service bureau has a computer system with HASP, then the Sharp Mohawk 2400 can sign on to that system as an RJE terminal. Data from a tape is transferred into the print queue of the remote HASP system, and is later printed on a highspeed printer.
4. It's possible to have highspeed printing at a customer location. If a customer has either equipment that is compatible with a Mohawk 2400, or a HASP system with a printer, data is transferred and printed as in (2) or (3) above.
5. A final possibility is interaction with one of the binary synchronous protocols. With this facility, a binary synchronous data transfer device sends data to or from the system. Such a setup, for example, enables you to dial a local phone number and receive data on the local highspeed printer.

IN-HOUSE SHARP APL

I.P. Sharp recognizes that time-sharing customers may wish to install their own SHARP APL programs on an in-house facility. Two of the many good reasons for this include greater customer savings and specific security. The environment supporting this distributed program product may be a dedicated machine or a mixed processing machine. In-house SHARP APL is now available for computers compatible with the IBM System 370. You can choose an operating system under SHARP DOS (a specialized operating system for running SHARP APL), or MVT, or MVS. Any of these software environments can in turn run on a virtual machine under VM 370.

Users of the SHARP APL distributed program product may, if they wish, access their in-house system through the Sharp network, thereby themselves offering remote access to their own APL system from any location accessible by the Sharp network.

TELECOMMUNICATIONS

ACCESS TO THE NETWORK

Since 1969, I.P. Sharp's communications network has expanded to provide local telephone access to the Toronto computer centre from more than 400 cities around the world. For many customers, our network permits affiliates in different parts of the globe to share data instantly, making it a simple matter to synchronize planning at all corporate levels.

NETWORK FEATURES

Sharp has its own dedicated communications network. This is supplemented by the public carriers, Dataroute in Canada, and Tymnet and Telenet in the U.S. In 1973, I.P. Sharp introduced its own internally developed packet-switching system. Packet-switching greatly improves the effective capacity of communication lines. At the same time, it permits automatic validation and retransmission, for extremely high reliability of transmission. Packet-switching was implemented first in Europe and became operative worldwide in 1976.

The network has brought a number of significant and unrivalled benefits to the users of SHARP APL:

Reliability: Communication failures are greatly reduced when compared with conventional multiplexing systems. Furthermore, users are always kept informed of the status of their connection with APL.

Virtually error-free transmission: Transmission errors are automatically detected and corrected by the network. At each node of the network, a minicomputer can request and receive re-transmission from the other node, automatically and imperceptibly.

Fast response: The network optimizes interactive use of APL. Even with all its internal error checking, the network can usually transmit input or output at the terminal's full speed, without detectable pauses or delays.

Terminal flexibility: Terminals of varying types and speeds may be connected to the network.

Low connect charges: The network's efficient line utilization enables very low APL connect charges. The existence of so many local access points also reduces your dial-up costs. Character charges are assessed independently of the transmission speed.

TERMINAL SUPPORT

All terminals making interactive use of the Sharp network must be asynchronous (also known as "start/stop") terminals. Several different transmission modes are supported by the Sharp network:

Mode	Characters Per Second
300 BAUD ASCII	30
134.5 BAUD BCD	15
300 BAUD BCD	30
1200 BAUD ASCII	120

Not all points of access support all of the above transmission modes, though 300 BAUD ASCII is available everywhere. 1200 BAUD support is available at certain locations, through suitable modems; there is no surcharge for its use.

Increasingly, "intelligent terminals" are being attached to the network. In particular, special interface software is available for the IBM 5110, permitting it to serve both as an APL processor and at the same time as a terminal to the central system.

The experts at I.P. Sharp can help you select a terminal that suits your needs.

NETWORK HARDWARE

The hardware behind the SHARP APL network consists of Computer Automation Alpha LSI-2/20 minicomputers. These number more than 80 and are located throughout the world. In their role as communications processors, the Alphas are known as **concentrators**. Each concentrator forms a **node** in the network and is connected to one or more other nodes by highspeed synchronous lines. Two high capacity transatlantic lines link North America and Europe. If one should ever fail, the total traffic may be switched to the remaining line.

Accessing SHARP APL involves dialing through a normal telephone line to your nearest node. The link you make with the computer in this manner is called a **port**. At present, the APL system can support over 400 ports simultaneously. A number of IBM 3705's provide front-end processing for the communications network and also function as nodes.

PACKET-SWITCHING

All messages sent between the APL system and a terminal connected through the network are split into one or more fixed length **packets**. Along with the message itself, each packet contains information concerning error-checking, and the origin and destination of the data. Having left the originating node, packets travel independently through the network under the control of a protocol. They are forwarded from one node to the next until their destination node is reached. Only then are the packets reassembled into the correct order to form the original message.

Virtually error-free transmission is possible because a packet is checked for errors as it travels through each node. If an error is detected, retransmission is requested from the previous node; otherwise the packet is forwarded to the next node along the route. As well as ensuring the integrity of the transmitted data, the I.P. Sharp network protocol prevents possible breaches of security resulting from line failures.

The fact that the packet length is optimized allows for a fast response to the concise messages which arise from the normal pattern of interactive APL usage.

LINE UTILIZATION

The efficient use of lines in the Sharp packet-switching system is based on statistical multiplexing. This takes advantage of the fact that not all terminals connected to the network operate simultaneously, or at full speed. Thus, low APL connect charges are possible.

In conventional systems, such as time division multiplexing, a fixed bandwidth is allocated for the duration of each terminal session. However, packet-switching systems can achieve very high line utilization by freeing communication resources when they are not actually being used by a terminal — as when the user is thinking and no characters are being sent. As a typical example, sixteen 300 BAUD terminals may be handled easily by one 2400 BAUD line.

At times of overload, the I.P. Sharp concentrators can queue packets until a transmission slot is available. To you, this appears as slight pauses in the midst of terminal output.

NETWORK INTELLIGENCE

A high degree of intelligence is built into the concentrators. Line “hits” or failures do not disconnect you from APL if lines stabilize within 15 seconds. At all times, the concentrators are able to reply to you, telling you the status of your connection with APL.

The concentrator’s built-in intelligence also enables the system to automatically recognize and adapt both to the type of terminal being used (ASCII or BCD) and to its speed.

TELEX

Facilities are provided to enable use of the SHARP APL system through the international Telex network from locations not currently on the network. Telex nodes exist in Amsterdam and in Rochester, New York. Telex accessibility enables multi-national corporations to access data easily from all their subsidiary companies, for consolidation at a central site, even from cities or countries in which other forms of access are not yet available. Standard Telex terminals are of very limited use as programming terminals, but are adequate for entering data, communicating within the company, and printing small reports.

COMPUTER CENTRE FACILITIES

HARDWARE

The SHARP APL system in Toronto runs on two Amdahl 470 V6 Mod II computers, each having 4 megabytes of memory. During peak usage, the system optimizes its hardware resources by running with both Amdahls — one CPU mastering over a slave CPU. As a means of preventing downtime on the system, if a hardware failure occurs in one Amdahl, the remaining CPU is completely capable of running the system.

Hardware	Amount	Description
Computers	2	- Amdahl 470 V6 Mod II's (4 megabytes of M.O.S. integrated circuit memory)
Disk units	56	- Memorex 3670 drives - double density (200 megabytes each)
Tape units	5	- Memorex units
Printers	2	- IBM 3211
	1	- IBM 1403
Card reader/punch	1	- IBM 2540
	1	- IBM 2501
Communications controllers	4	- IBM 3705

In addition to the above hardware, Mohawk Data Sciences minicomputers (Mohawk 2400's) are available in Toronto and several branch offices, allowing high volume data transfer to and from Toronto, and remote highspeed printing. Branch offices currently having this facility are: Calgary, Alberta; Vancouver, British Columbia; and London, England.

HOURS OF OPERATION

The SHARP APL system is available **continuously**, including holidays, except during the following times stated in **UTC** (Universal Time Coordinated):

Saturday	04:00 - 11:00
Sunday	04:00 - 11:00

Hours of operation on weekends are subject to change without notice. These infrequent schedule changes generally occur to permit upgrading of the facilities.

SYSTEM SOFTWARE

APL

The programming language offered on the I.P. Sharp system is an interactive language called APL.

Why offer APL? It's the best general-purpose language available today. Increases in programmer productivity resulting from the use of APL over traditional batch languages are quoted conservatively at 5 to 1.

Why **only** APL? Offering only one language has two main advantages. First, the company is able to concentrate its expertise in one main area, resulting in a product of quality and a knowledgeable staff. Second, system reliability depends, to a large degree, on the number of program products offered. I.P. Sharp's exceptional reliability record has, in part, been due to having only one main program product.

Some reasons why APL is such a good general-purpose language are:

1. Programmer productivity is significantly increased because
 - APL is an array processor which makes "looping" rare
 - many "pre-programmed" algorithms are available as part of the language
 - APL offers powerful debugging aids
 - APL is interactive
2. Time spent maintaining APL systems is significantly reduced because:
 - APL promotes modularity which has given rise to the concept of "throw-away" code
 - APL systems are easily made self-documenting
3. It is easy for non-programmers to learn a subset of APL and to use it effectively within a very short time.

APL is gradually revolutionizing the data processing industry. Traditional languages tend toward massive, and inflexible pre-packaged solutions because, with most other languages, the time spent on system development is such a large part of the investment. Using APL, it is possible to produce customized solutions to problems, often in less time than it would take to modify a package.

FILE SYSTEM SOFTWARE

A capability for handling files was one of the earliest enhancements that I.P. Sharp Associates added to its APL system in early 1970. The SHARP APL file system was developed to fit APL. It allows flexible file designs, quick implementation for application systems, and secure data bases. (See "Access Security" for more details.)

The file system is highly suitable for handling large data bases, as shown by those currently available on the I.P. Sharp system. (See "Public Data Bases" for more details.)

Characteristics of the file system which promote design flexibility and fast implementation are:

- Files may contain fixed and/or variable length records
- Each component is self-describing, and so components of different data types (e.g., character or numeric) may be contained within a single file, or (using package data) within a single component
- Any APL variable or function may be written to a file “as is”. When retrieved, the variable or function resumes its original form and value
- Data retrieval may be sequential or random
- File updates may be “growing replaces”; that is, an existing component may be replaced by a larger one
- No cumbersome job control language (JCL) is necessary. Simple commands allow you to create files, resize files, rename files, open files, etc.
- Shared access is permitted. Given appropriate access controls, multiple users can use the same file at the same time.

APPLICATIONS LIBRARY SOFTWARE

There are approximately 200 applications workspaces available to every user of the I.P. Sharp system. They cover a wide variety of application areas. Most workspaces are available for sale or rental to installations running in-house SHARP APL.

The library categories are as follows:

Library Numbers	Subject Areas
1-9	General
10-19	APL Education
20-29	Mathematics
30-39	Statistical Analysis
40-49	Operations Research
50-59	Finance
60-69	Engineering
70-79	Miscellaneous Systems
80-89	Data Base Software
90-99	Fun and Games
120-139	Industry-specific Software

For more details, refer to the “SHARP APL Data Base and Applications Library Catalogue”.

APPLICATION SOFTWARE

Applications systems have been developed to provide our users with sets of programs that deal with specific areas. Some of the application areas and systems we offer are described below.

CORPORATE PLANNING/PROJECT ANALYSIS

AIDS

AIDS is a packaged approach to planning and control, designed to assist the manager in applying models for time-oriented data and mathematical techniques to a wide variety of decision areas.

CAPERS

CAPERS is a group of programs which provide facilities for analyzing the economic feasibility of a wide range of capital investment projects, using the discounted cash flow method.

CONSOL

CONSOL permits consolidation of financial statements from many subsidiaries including automatic conversion of currencies, and alternative consolidation paths.

FINANCIAL ANALYSIS

Financial Analysis is a group of programs designed to help money managers make the types of decisions necessary in today's dynamic society. You can solve problems in financial analysis, planning, project analysis, loan management, capital budgeting, depreciation, interest rates, and present and future values.

RISK ANALYSIS

Risk Analysis is a set of programs designed to help the decision maker quantify the risk element in investment ventures. It is designed to perform the laborious and tedious calculations that need to be produced during the course of project analysis.

STATISTICAL ANALYSIS

Statistical Analysis consists of hundreds of programs which can be used for descriptive, parametric and non-parametric statistics, statistical tests, model parameter estimation, probability functions and distributions, sample generation, analysis of variance, multivariate analysis, and time series analysis.

DATA BASE MANAGEMENT AND REPORTING SYSTEMS

MABRA

MABRA provides a cost-effective and easy way to keep records straight. This is a generalized system for handling rectangular records with mixed-type, fixed-length fields. MABRA's capabilities cover a wide range of applications including personnel and customer profiles, inventory control, and questionnaire analysis.

MAGIC

MAGIC is a powerful system which allows the user to retrieve, manipulate, and display time series data. The data can be stored in one of the public data bases available on the SHARP APL system, or in your own private data base.

RETRIEVE

RETRIEVE is a time series data base retrieval mechanism (but not a generalized data base management system). It is compatible with a wide variety of data bases, so that, even if your application requires data from several of the public data bases available on SHARP APL, you need only acquaint yourself with one method of retrieval.

SUPERPLOT

High-resolution graphs, plots, histograms, and maps can be generated from tabular data. They can be drawn on typewriter-like terminals with "graphics" features, but they show to best advantage in devices such as the Hewlett Packard 7221A flat-bed plotter (4 colours), the Tektronix 4015 Screen and 4662 flat bed. Options can be specified conversationally or under program control, so both the novice and experienced programmer can use the package efficiently. These capabilities are directly available with MAGIC (for time series data), but can also be used with any other data.

GRAPHICS

GRAPHICS

Graphics is a device-independent system which supports line drawings and plots on the Tektronix 4013/4015 and Hewlett Packard 2648A terminals, the Tektronix 4662 and Hewlett Packard 7221A plotters, and most Diablo, Anderson/Jacobson, and Qume-based hard copy terminals. Picture editing is supported on the Tektronix 4015 screen.

INSURANCE

ACTPAK

The SHARP APL Actuarial Package provides an effective means of evaluating most of the life contingency and compound interest functions that are likely to be encountered. The data base includes primitive mortality information, projection and salary scales, and rates of withdrawal, disability, and remarriage.

GAS AND OIL INDUSTRY

GOFER

GOFER is an easy-to-use and flexible system for analyzing the profitability of developing gas and oil fields. This system helps you evaluate alternatives and perform sensitivity analysis studies, while minimizing both the time and cost involved in the production of results for a given project.

ECONOMETRICS/FORECASTING

BOX-JENKINS

Box-Jenkins is a powerful forecasting technique, used for analysis of time series data in areas such as planning, purchasing, marketing, and on-line process control. The SHARP APL implementation of this technique guides the user through the process, from the model identification stage to the generation of forecast sets.

X-11

X-11 offers a simple-to-use technique for the seasonal adjustment of time series data, making it possible to fit highly irregular series to relatively stable seasonal curves.

CRITICAL PATH AND NETWORK ANALYSIS

SNAP

SNAP enables you to plan and schedule the activities involved in a project and to control the ways for minimizing overall project time. Once your project network has been established you can make comparisons between the planned time and the actual time.

TEXT PROCESSING

TEXT EDITOR

The Text Editor is a system for entering, correcting, and formatting text. As the text is entered, format control codes are also entered. These prescribe how the document should look when it is printed. The text can be changed and reformatted at any time, thus eliminating the task of retyping the entire document.

ELECTRONIC MAIL

MAILBOX

Mailbox is a fast and reliable on-line method for dispatching messages to a central repository so that they can be retrieved on demand by specified recipients. The sender has complete control over the format of the message. The sender can release the message for display by an individual or by a group of individuals. Messages may be marked "urgent" or "confidential" and may be copied to other recipients automatically.

The "Application Systems" fact sheet provides more information on available systems. For more detailed information, refer to the manuals describing each of these systems.

DATA BASES

Data bases on the SHARP APL system can be categorized broadly as public or private. Public data bases are those that are maintained and distributed by I.P. Sharp Associates. They are generally provided to all interested customers with no access surcharge. Private data bases are specific to a particular customer, and usually are generated by the customer's own activities. Their access is generally restricted.

PRIVATE DATA BASES

Use of a central computer, accessible through the worldwide communications network, enables customers in different geographic locations to access the **same** central data base. The obvious benefit of such a facility is that all locations are working from the most current copy of the data, whether that data is financial, inventory, personnel, or whatever. In conjunction with this universal access, we provide an array of system features which enables the user to maintain the integrity of data. Read/write access can be controlled at any level ranging from entire files down to individual fields. Files may be updated or created either directly from the user's terminal or by means of standard batch processing techniques.

PUBLIC DATA BASES

Over the years, I.P. Sharp has responded to user needs by making data available from a variety of sources — a policy to which we remain committed. As of this writing, we have approximately 3.5 billion bytes of data on-line.

The public data bases include data in the following areas:

- Economic
- Financial (Securities, Banking)
- Exchange Rates
- Airline
- Energy

Each of these areas is described more fully in the appropriate brochure. Each area is constantly undergoing review for enhancements, such as representing more countries in the Economic data. Likewise, customers' needs are monitored for expansion into areas other than those above.

In conjunction with each data base, a full suite of programs for retrieval and manipulation is provided. An important point to note is that the retrieval function will, where sensible, return data in a compatible form that enables analysis between data bases.

DOCUMENTATION

GENERAL NEWS

The public library workspace 1 *NEWS* describes new features as they are developed. Users should check it regularly. Information of immediate concern is usually indicated in a brief message sent to all users at sign-on when a change is imminent. It usually indicates where more detailed information may be found.

The I.P. Sharp Newsletter is published every other month. It is designed to keep customers up-to-date on the latest company and system developments. The newsletter contains articles on a wide variety of topics, including announcements of system enhancements, new and modified public libraries, new personnel, solutions to technical problems of general interest, previews of things to come, APL course schedules, and changes and additions to public data bases.

SHARP APL REFERENCE MANUAL

The APL language as available in the SHARP APL system, is described in detail in the SHARP APL Reference Manual, available through Sharp branch offices. This 350 page reference describes the organization of the Sharp systems, and offers definitions of all APL primitives and system functions. It is illustrated, and has an extensive index.

PUBLIC LIBRARY AND DATA BASE DOCUMENTATION

Documentation on public libraries takes two main forms. For nearly all libraries, documentation is stored on-line and can be obtained by typing *DESCRIBE* after loading the workspace. For many of the larger public libraries, manuals are available which describe the library and its use in detail. If you want a current list of the available application libraries, it exists on-line in workspace 1 *PUBLICLIBS*. The publication, "SHARP APL Applications Library Catalogue", is also available, listing each library and giving a brief description of it.

You can find documentation for accessing Sharp data bases either on-line or in a user's manual. Directories of the data bases, if not published by the suppliers of the data, are published by I.P. Sharp Associates.

SHARP APL TECHNICAL NOTES

On-going enhancements to the SHARP APL system, in addition to being announced in 1 *NEWS* and in the newsletter, warrant a more detailed description. SHARP APL Technical Notes (SATN's) are published when appropriate to complement and update the information. A SATN generally contains a terse, detailed technical description of a new feature, along with helpful examples and a discussion of the feature's impact on our users.

TECHNICAL SUPPORT

GENERAL CUSTOMER SUPPORT

General customer support is provided to help you make the most effective and economical use of the I.P. Sharp system. This kind of support is given to you at no charge, and generally consists of advice for APL programming and systems design, periodic visits to your offices, explanation of new system features, minor changes to customized packages, and answers to all other questions about the Sharp system.

SYSTEM EDUCATION

In an effort to provide a complete service, I.P. Sharp offers courses relating many aspects of the Sharp system. These courses range from five-day courses which teach SHARP APL to half-day seminars which discuss new system features. Schedules for courses being given at branch offices are published in the I.P. Sharp Newsletter. Special courses to meet the needs of particular customers or industries may be developed on request.

CONSULTING

Frequently, I.P. Sharp consultants design and implement complete APL systems for customers. Such projects are usually handled by local I.P. Sharp consultants. However, if specific expertise is not available in a local office, specialists from other locations can often be made available.

SECURITY

SYSTEM FAILURE

In the case of a complete system failure, no data in workspaces or files older than 4 seconds are lost. Terminals disconnecting from the I.P. Sharp system as a result of line drops result in no data loss whatever.

In either case, the "active" workspace is automatically saved in a *CONTINUE* workspace and any open files are closed. Later, the continue workspace can be loaded, and work resumed. This workspace is stored until you care to dispose of it, or until it is overwritten by another *CONTINUE*.

COMPUTER CENTRE SECURITY

While Sharp recognizes that software security is of first priority, the Toronto Computer Centre is also well aware of the need for environmental security. To this end, the following steps have been taken to protect the computer centre:

A custom-designed fire detection system is operative.

The computer centre is located in a modern office building in downtown Toronto. This location ensures ready access to public utilities such as fire protection, electric power supply, and telephone service.

The computer room is restricted to authorized personnel only.

Computer operators are on duty 24 hours per day, every day. The system is always staffed and operational.

DATA BACKUP PROCEDURES

The following backup procedures exist to ensure maximum data security at all times:

File Backup Procedures

- | | |
|---------|---|
| Monthly | - Two complete copies of all files are made on the first Friday of every month. One copy is kept on-site for two years, while the second is stored in an off-site vault for four years. |
| Weekly | - A complete copy of all files is taken on all other Friday evenings and is kept on-site for 90 days. |
| Daily | - A copy of all changes made to the files, since the last complete copy is taken every day and kept on-site for 90 days. |

Workspace Backup Procedures

- Monthly - Two complete copies of all workspaces are taken on the Saturday following the monthly file backup. Storage is the same as for monthly file backup.
- Daily - A copy of every workspace saved or resaved since the last monthly copy is taken every day, and kept on-site for 90 days.

ACCESS SECURITY

The privacy of your data is of paramount concern to I.P. Sharp. We offer one of the most secure systems in the computer industry today. Some of the security features are:

Every account number has a password known only to the owner of that account. The password can be changed at will by the account owner.

A "blackened area," or blot, is printed before you sign on to the system so that your account number and password are unreadable after being typed.

All user sign-ons are recorded on a system log. A log is also kept of all unsuccessful sign-on attempts, or attempts at unauthorized access to files or workspaces.

The owner of a data file may grant many levels of access permission to other account numbers. Note that this permission must be explicitly granted before **any** access is allowed. Such permission controls who accesses the data, what data may be accessed, and in what fashion.

System software automatically monitors all illegal attempts to access data files. Reports generated from this monitoring are reviewed daily at which time the account owners are notified.

Programs may be written so that you can monitor all successful and unsuccessful file access attempts, and disconnect account numbers which are unauthorized.

Your workspace can be given a password so that only you can load it. Passwords may be changed or removed at will.

Functions (programs) may be "locked" so that the APL code can **never** be displayed or altered.

Workspaces may be "sealed" so that the contents of a whole workspace can **never** be displayed or altered.

CONTRACT TERMS

The "SHARP APL System Usage Contract" commits a customer only to payment for resources used. The charges for those resources are listed on the face of the contract form. Note that I.P. Sharp requires no initiation fee, and no monthly minimum.

A customer ceases to be billed when usage of the system ceases, and when data and program storage is released. A contract may be officially terminated on one month's written notice from either party. There is no penalty charge for termination of a contract.

Exact terms of the I.P. Sharp contract are outlined on the reverse side of the contract.

